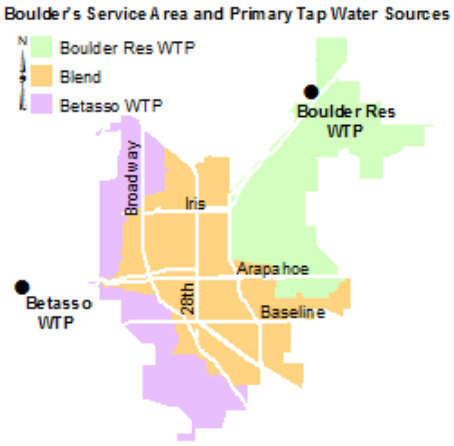
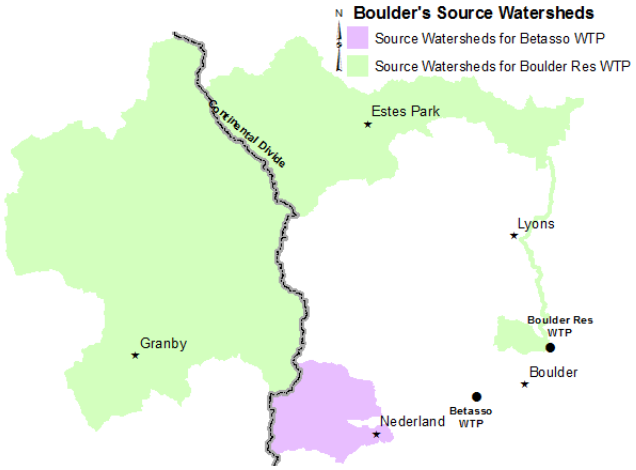
City of Boulder Drinking Water Summary

February 2017

WHERE DOES BOULDER'S DRINKING WATER COME FROM?

The City of Boulder is fortunate to have several high quality sources of water, including the headwaters of Boulder Creek and diversions from the upper Colorado River on the west slope. Boulder has two water treatment plants (WTP) and depending on where you live and the time of year, your water may be coming from the Betasso WTP, the Boulder Reservoir WTP, or both.





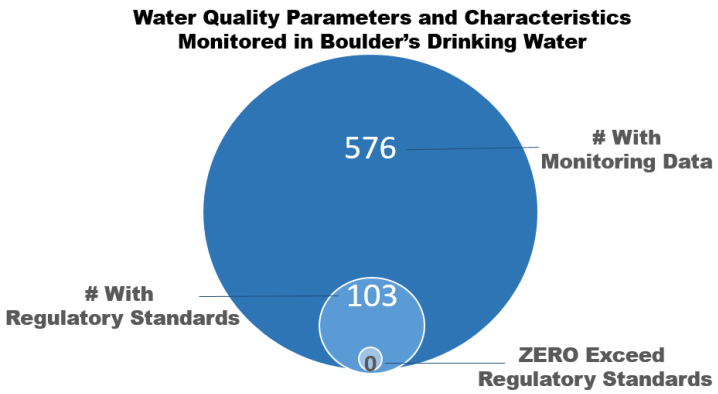
The Betasso WTP is located in the foothills west of Boulder and treats water from Barker and Lakewood Reservoirs, which are fed by Middle Boulder Creek and North Boulder Creek. The Boulder Reservoir WTP treats water from Boulder Reservoir and the Boulder Feeder Canal (May through October), which is operated by Northern Colorado Water Conservancy District and delivers water from the upper Colorado River via Carter Lake.

PROTECTING DRINKING WATER AT THE SOURCE

Protecting drinking water at its source can help to prevent contamination and minimize treatment needs and costs. The city has long viewed source water protection as a proactive approach to preserving the integrity of its water supply, and is working with watershed stakeholders to document and further implement a Source Water Protection Plan. Properly disposing of hazardous waste, maintaining septic systems and storage tanks, and practicing proper land management and pet waste disposal, can minimize impacts to water supplies.

DRINKING WATER MONITORING PROGRAM

As water flows downstream it dissolves naturally occurring minerals and metals and can also pick up substances from human and animal activities. All drinking water, including bottled water, contains substances that do not necessarily pose health risks.



The City of Boulder goes above and beyond regulatory requirements, having monitoring data for more than 500 water quality parameters and characteristics in treated drinking water, including nutrients, metals, pathogens, radionuclides, and organic compounds, including disinfection byproducts, herbicides, pesticides, pharmaceuticals, household products, and hormones.

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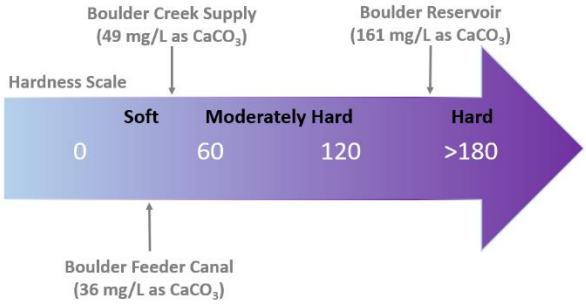
COMMON TOPICS OF INTEREST TO CUSTOMERS

Water Hardness Levels

Naturally occurring minerals, including calcium and magnesium, increase water hardness. Very hard water can form scale and leave deposits in sinks. When washing with soft water, your hands may still feel slippery even after rinsing away the soap. The city's water is generally soft, but water from the Boulder Creek water supply and from Boulder Feeder Canal is less mineralized (softer) than water from Boulder Reservoir.



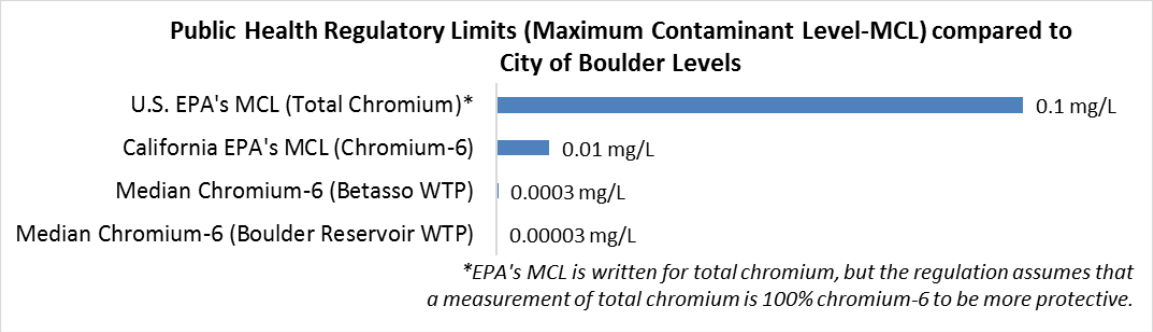
Lead and Copper

Lead and copper in drinking water come primarily from materials and components associated with service lines and home plumbing. The city is required to complete comprehensive lead and copper monitoring every three years. As shown in the table below, lead and copper levels measured at taps throughout the City of Boulder's distribution system are well below the U.S. Environmental Protection Agency's (EPA) regulatory Action Levels set to protect public health.

Parameter	Units	Compliance Level Detected at the Tap	Regulatory Action Level	Number of Sites Exceeding the Action Level	Violation (Yes/No)	Sample Date
Lead	mg/L	0.002	0.015	0	No	2014
Copper	mg/L	0.17	1.3	0	No	2014

Chromium

Chromium is a metal naturally present in rocks, soil, plants and animals. The most common forms of chromium that occur in water and the environment are trivalent chromium (chromium-3) and hexavalent chromium (chromium-6). Chromium-3 is a nutrient found in most foods, including vegetables, fruits, meats and grains. Chromium-6 can occur from natural geologic erosion and is also used in some industrial processes. As shown in the figure below, levels of chromium-6 in Boulder's treated drinking water are well below public health regulatory limits.



Algae Blooms and Cyanotoxins

Algae are a natural and beneficial component of freshwater and marine water resources. Some algal blooms can contain blue-green algae. Certain species of blue-green algae are capable of producing cyanotoxins, which may pose a public health risk if people are exposed to elevated levels via recreational activities or drinking water. While algae are not currently regulated, the city has taken a proactive approach by monitoring for algal blooms and cyanotoxins in its drinking water reservoirs. Cyanotoxins have not been detected in any samples.

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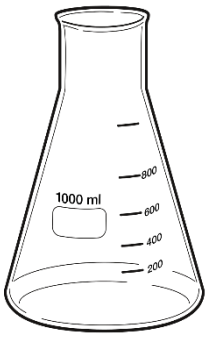
DRINKING WATER QUALITY- SUMMARY OF RESULTS

How to Read Your Drinking Water Quality Results

The city routinely monitors drinking water quality. The tables in this section compare the city's drinking water quality to state and federal standards, where applicable. The standards are set to protect public health or prevent taste and odor or discoloration.

Types of State and Federal Standards



Action Level (AL): Concentration that triggers certain regulatory requirements.

Maximum Contaminant Level (MCL): The highest concentration allowed in drinking water. MCL concentrations are as close to MCLGs as possible, using the best available treatment technology.

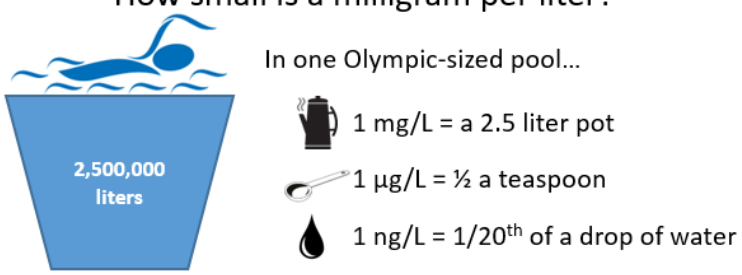
Maximum Contaminant Level Goal (MCLG): The concentration in drinking water below which there is no known or expected risk to public health. MCLG's allow for a margin of safety.

Maximum Secondary Level (MSL): A non-enforceable concentration set to minimize taste and odor or discoloration.

Treatment Technique (TT): A required treatment process intended to reduce the concentration in drinking water.

Units and Abbreviations

mg/L = milligrams per liter (one part per million parts)
µg/L = micrograms per liter (one part per billion parts)
ng/L = nanograms per liter (one part per trillion parts)
NTU = Nephalometric turbidity units
µmhos/cm = micromhos per centimeter
< = Concentration below the detection limit



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Detected Water Quality Parameters

The data presented in the table below represent median sampling results from the most recent two-year sampling period. In most cases, 2017 is the most recent sampling year. However, not all water quality parameters are monitored each year because concentrations are not expected to vary significantly from year to year. Because data reflect two-year medians, concentrations may differ from those reported in the city's annual Drinking Water Quality Reports. Individuals are encouraged to review the regulatory standards on the U.S. EPA's website.

Parameter	Units	Description	Betasso WTP (Median)	Boulder Reservoir WTP (Median)	Federal or State Standard
Alkalinity (as CaCO3)	mg/L	Buffering capacity of water	45.3	37.1	
pH	Std Units	Measure of how acidic or basic the water is	7.6	7.6	MSL= 6.5-8.5 (range)
Turbidity	ntu	Water clarity measurement	0.1	0.1	TT
Carbon, Total Organic	mg/L	Natural organic matter	1.0	2.4	
UV-254 absorbance	cm-1	Indirect measure of organic matter	0.01	0.03	
Specific Conductivity	µmho/cm	Indirect measurement of ions in water	122.2	134.3	
Nitrogen, Nitrate	mg/L	Nutrient	0.1	0.04	MCL= 10
Phosphorus, Total	µg/L	Nutrient	3.2	2.9	
Geosmin	µg/L	Algal byproduct	No Data	0.002	
2-Methylisoborneol (MIB)	µg/L	Algal byproduct	No Data	0.01	
Chlorine	mg/L	Disinfectant	1.2	1.0	
Bromochloroacetic acid	µg/L	Disinfection byproduct	<1	1.8	
Bromodichloroacetic acid	µg/L	Disinfection byproduct	1.1	<1	
Chlorate	µg/L	Disinfection byproduct	140.0	82.5	
Chlorodibromomethane	µg/L	Disinfection byproduct	<0.5	1.8	
Haloacetic Acids (HAA5)	µg/L	Disinfection byproduct	20.9	22.7	MCL= 60
Total Trihalomethanes	µg/L	Disinfection byproduct	21.9	30.7	MCL= 80
2,4-D	µg/L	Herbicide or pesticide	<0.005	0.01	MCL= 70
Triclopyr	µg/L	Herbicide or pesticide	<0.01	0.04	
Aluminum, Total	µg/L	Naturally occurring ion	24.8	11.7	MSL= 50-200
Arsenic, Total	µg/L	Naturally occurring ion	0.2	0.5	MCL= 10
Barium, Total	µg/L	Naturally occurring ion	6.7	21.7	MCL= 2000
Boron, Total	µg/L	Naturally occurring ion	7.0	17.0	
Calcium, Total	mg/L	Naturally occurring ion	19.2	29.5	
Chloride	mg/L	Naturally occurring ion	3.8	6.0	MSL= 250
Fluoride, Total	mg/L	Naturally occurring ion	0.8	0.7	MCL= 4; MSL= 2
Iron, Total	µg/L	Naturally occurring ion	20.6	11.0	MSL= 300
Magnesium, Total	mg/L	Naturally occurring ion	0.6	8.6	
Manganese, Total	µg/L	Naturally occurring ion	0.9	0.1	MSL= 50
Molybdenum, Total	µg/L	Naturally occurring ion	0.5	0.9	
Nickel, Total	µg/L	Naturally occurring ion	0.3	0.4	
Potassium, Total	mg/L	Naturally occurring ion	0.4	1.1	
Selenium, Total	µg/L	Naturally occurring ion	<0.36	0.7	MCL= 50
Silicon	mg/L	Naturally occurring ion	2.1	2.8	
Sodium, Total	µg/L	Naturally occurring ion	4.5	5,255	
Strontium, Total	µg/L	Naturally occurring ion	47.5	175	
Sulfate	mg/L	Naturally occurring ion	3.9	16.1	MSL= 250
Tin, Total	µg/L	Naturally occurring ion	0.03	No Data	
Vanadium, Total	µg/L	Naturally occurring ion	0.3	0.2	
Zinc, Total	µg/L	Naturally occurring ion	0.9	1.6	MSL= 5000
Sucralose	µg/L	Pharmaceuticals and Household Products	<0.015	0.1	
Uranium, Total	µg/L	Radionuclides	0.04	0.03	MCL= 30

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Not-Detected Water Quality Parameters

The following water quality parameters were monitored in treated drinking water at the Betasso and Boulder Reservoir WTPs, but two-year median values are below laboratory detection limits. In a few cases, the parameter was only monitored at one of the WTPs and the two-year median result was non-detect.

Disinfection Byproducts

- Bromate
- Bromochloromethane
- Bromoethane
- Chlorite
- Dibromoacetonitrile
- N-nitroso-diethylamine (NDEA)
- N-nitroso-dimethylamine (NDMA)
- N-nitroso-di-n-butylamine (NDBA)
- N-nitroso-di-n-propylamine (NDPA)
- N-nitroso-methylethylamine (NMEA)
- N-nitroso-pyrrolidine (NPYR)
- Tribromoacetic acid

Herbicides and Pesticides

- 1,1-Dichloropropene
- 1,3-Dichloropropene
- 2,4,5-TP (Silvex)
- 2,4,5-Trichlorophenoxyacetic acid
- 2,4,6-Trichlorophenol
- 2,4-Dichlorophenoxy butyric acid
- 3,5-Dichlorobenzoic acid
- 3-Hydroxycarbofuran
- 4-4'-DDD
- 4-4'-DDE
- 4-4'-DDT
- Acetamiprid
- Acetochlor
- Acetochlor ESA (ethane sulfonic acid)
- Acetochlor OA (oxanilic acid)
- Acifluorfen
- Alachlor
- Alachlor (Alanex)
- Alachlor ESA (ethane sulfonic acid)
- Alachlor OA (oxanilic acid)
- Aldicarb
- Aldicarb sulfone
- Aldicarb sulfoxide
- Aldrin
- Alpha BHC
- alpha-Chlordane
- Ametryn
- Atrazine
- Azoxystrobin
- Baygon
- Benalaxyl
- Bendiocarb
- Bensultap
- Bentazon
- Beta-BHC
- Bromacil
- Bromomethane
- Bromoxynil
- Bromuconazole
- Buprofezin
- Butachlor
- Butylate
- Captan
- Carbaryl
- Carbendazim
- Carbofuran
- Cartap
- Chlordane
- Chlorfenvinphos
- Chlorobenzilate
- Chloroneb
- Chlorothalonil
- Chlorotoluron
- Chlorpyrifos (Dursban)
- Chlorpyrifos methyl
- Cyanazine
- Cyproconazole
- Cyromazine
- Dalapon
- DCPA Mono & Diacid Degradate
- Deethylatrazine
- Deethylterbuthylazine
- Deisopropylatrazine
- Delta-BHC
- Diazinon
- Dibromochloropropane
- Dicamba
- Dichlorprop
- Dichlorvos
- Dieldrin
- Difenconazole
- Difenoxuron
- Diflubenzuron
- Dimethachlor
- Dimethenamide
- Dimethoate
- Dimethomorph
- Di-n-octylphthalate
- Dinoseb
- Dioxin
- Diquat
- Diuron
- Endosulfan I (alpha)
- Endosulfan II (beta)
- Endosulfan sulfate
- Endothall
- Endrin
- Endrin aldehyde
- EPTC (s-Ethyl dipropylthiocarbamate)
- Ethiofencarb
- Fenamiphos
- Fenuron
- Fipronil
- Flufenacet
- Flufenoxuron
- Fluometuron
- Fluoroacetamide
- Fluoroxypyr
- Fluridone
- Flutolanil
- gamma-Chlordane
- Glyphosate (Roundup)
- Heptachlor
- Heptachlor epoxide
- Heptachlor epoxide (isomer B)
- Hexachlorobenzene
- Hexachlorocyclopentadiene
- Hexaflumuron
- Hexazinone
- Hydroxyatrazine
- Imazalil
- Imazapyr
- Imazaquin
- Imidacloprid
- Ioxynil
- Iprodione
- Irgarol 1051
- Irgarol metabolite
- Isofenphos
- Isoproturon
- Isoxaben
- Isoxaflutole
- Lenacil
- Lindane
- Linuron

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- Malaoxon
- Malathion
- Metalaxyl
- Metamitron
- Methidathion
- Methiocarb
- Methiocarb sulfone
- Methomyl
- Methoxychlor
- Metolachlor
- Metolachlor ESA (ethane sulfonic acid)
- Metolachlor OA (oxanilic acid)
- Metolcarb
- Metribuzin
- Molinate
- Monuron
- Nicosulfuron
- Nitenpyram
- o-Dichlorobenzene
- Oxadixyl
- Oxamyl
- para-Dichlorobenzene
- Paraquat
- Parathion (E605)
- Parathion ethyl
- Parathion methyl
- Pendimethalin
- Pentachlorophenol
- Permethrin
- Phenylphenol
- Phosmet
- Picloram
- Prochloraz
- Profenofos
- Promecarb
- Prometon
- Prometryn
- Propachlor
- Propanil
- Propanolol
- Propazine
- Propiconazole
- Propoxur
- Prosulfocarb
- Prosulfuron
- Simazine
- Spinosad A
- Spinosad D
- Spiromesifen
- Spiroxamine
- Terbacil
- Terbufos sulfone
- Terbuthylazine
- Terbutryn
- Thiabendazole
- Thiacloprid
- Thiobencarb (ELAP)
- Thiocyclam
- Thiosultap
- Toxaphene
- trans-Nonachlor
- Triflumizole
- Trifluralin

Hormone

- 17-alpha-Estradiol
- 17-alpha-Ethynyl estradiol
- 17-beta-estradiol
- 4-Androstene-3,17-dione
- cis-Testosterone
- Diethylstilbestrol (DES)
- Equilin
- Estradiol
- Estriol
- Estrone
- Progesterone
- Testosterone
- trans-Testosterone

Metals

- Antimony, Total
- Beryllium, Total
- Cadmium, Total
- Chromium, Total
- Cobalt, Total
- Cyanide, Total
- Mercury, Total
- Silver, Total
- Thallium, Total

Nutrients

- Nitrogen Nitrite
- Phosphorus, Ortho

Organic Chemical

- 1,1,1,2-Tetrachloroethane
- 1,1,1-Trichloroethane
- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichloroethane
- 1,1-Dichloroethane
- 1,1-Dichloroethylene
- 1,2,3-Trichlorobenzene
- 1,2,3-Trichloropropane
- 1,2,4-Trichlorobenzene
- 1,2,4-Trimethylbenzene
- 1,2-Dichloroethane
- 1,2-Dichloropropane
- 1,3,5-Trimethylbenzene
- 1,3-Butadiene
- 1,3-Dichloropropane
- 1,3-Dinitrobenzine
- 1,4-Dioxane
- 2,2',4,4',5,5'-hexabromobiphenyl (HBB)
- 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)
- 2,2',4,4',5-pentabromodiphenyl ether (BDE-99)
- 2,2',4,4',6-pentabromodiphenyl ether BDE-100
- 2,2',4,4'-tetrabromodiphenyl ether (BDE-47)
- 2,2-Dichloropropane
- 2,4,6-Trinitrotoluene (TNT)
- 2,4-Dinitrotoluene
- 2,6-Dinitrotoluene
- 2-Butanone
- 4-Methyl-2-Pentanone
- 4-n-Octylphenol
- 4-tert-Octylphenol
- Acenaphthylene
- Anthracene
- Benzene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Bisphenol A
- Bromobenzene
- Butylbenzylphthalate
- Carbon Disulfide
- Carbon Tetrachloride
- Chlorobenzene(mono)
- Chlorodifluoromethane
- Chloroethane
- Chloromethane
- Chrysene
- cis-1,2-Dichloroethylene
- Di(2-ethylhexyl)adipate
- Di(2-ethylhexyl)phthalate
- Dibenzo(a,h)anthracene
- Dibromomethane
- Dichlorodifluoromethane
- Dichloromethane
- Diethylphthalate
- Di-isopropyl ether
- Dimethylphthalate
- Di-n-Butylphthalate
- Diphenylamine
- Ethylbenzene
- Ethylene Dibromide
- Fluoranthene
- Fluorene
- Fluorotrichloromethane
- Hexachlorobutadiene
- Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)

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- Indeno(1,2,3,c,d)Pyrene
- Isophorone
- Isopropylbenzene
- m,p-Xylenes
- m-Dichlorobenzene
- Methyl Tert-butyl ether (MTBE)
- Naphthalene
- n-Butylbenzene
- Nonylphenol, isomer mix
- n-Propylbenzene
- o-Chlorotoluene
- o-Xylene
- PCB 1016 Aroclor
- PCB 1221 Aroclor
- PCB 1232 Aroclor
- PCB 1242 Aroclor
- PCB 1248 Aroclor
- PCB 1254 Aroclor
- PCB 1260 Aroclor
- p-Chlorotoluene
- Perchlorate
- Perfluorobutanesulfonic acid
- Perfluoroheptanoic acid
- Perfluorohexanesulfonic acid
- Perfluorononanoic acid
- Perfluorooctane Sulfonate (PFOS)
- Perfluorooctanesulfonic acid
- Perfluorooctanoic acid
- Phenanthrene
- p-Isopropyltoluene
- Polychlorinated biphenyls (PCB)
- Pyrene
- Sec-butylbenzene
- Styrene
- tert-amyl Methyl Ether
- tert-Butyl Ethyl Ether
- Tert-butylbenzene
- Tetrabromobisphenol A
- Tetrachloroethylene
- Toluene
- trans-1,2-Dichloroethylene
- trans-1,3-Dichloropropene
- Trichloroethylene
- Trichlorotrifluoroethane
- Vinyl chloride
- Xylenes

Pathogen Indicator

- Coliform, E coli
- Coliform, Total

Pharmaceuticals and Household Products

- 1,7-Dimethylxanthine
- 4-Nitrophenol
- Acenaphthene
- Acetaminophen
- Albuterol (Salbutamol)
- Ampicillin
- Atenolol
- Azithromycin
- BAM (septic additive)
- Bupropion
- Bupropion metabolite
- Butilbatal
- Caffeine
- Carbamazapine
- Carbamazepine
- Carbamazepine metabolite
- Cefotaxime
- Cimetidine
- Ciprofloxacin
- Clarithromycin
- Cloxacillin
- Cotinine
- DEET
- Dehydronifedipine
- Dextromethorphan
- Dextrorphan
- Diazepam
- Diclofenac
- Digoxigenin
- Digoxin
- Diltiazem
- Diphenhydramine
- Enrofloxacin
- Erythromycin
- Erythromycin Anhydrate
- Flumequine
- Fluoxetine
- Gabapentin
- Gemfibrozil
- Ibuprofen
- Iopromide
- Lamotrigine
- Lamotrigine metabolite
- Lincomycin
- Lomefloxacin
- Lufenuron
- Mebendazole
- Metformin
- Metoprolol
- Metroprolol
- Miconazole
- Naproxen
- Norfloxacin
- Norvenlafaxine Metabolite
- Ofloxacin
- Oxacillin
- Oxolinic Acid
- Oxycodone
- Ranitidine
- Roxithromycin
- Sarafloxacin
- Sulfachloropyridazine
- Sulfadiazine
- Sulfadimethoxine
- Sulfamerazine
- Sulfamethazine
- Sulfamethizole
- Sulfamethoxazole
- Sulfanilamide
- Teflubenzuron
- Triclocarban
- Triclosan
- Trimethoprim
- Tylosin
- Venlafaxine
- Venlafaxine metabolite
- Viginiamycin
- Warfarin

Radionuclides

- Alpha, Gross
- Beta, Gross
- Radium 226
- Radium 228